BULLETIN

OF THE INSTITUTE OF METALS

VOLUME 4 FEBRUARY 1959 PART 18

INSTITUTE NEWS

Spring Meeting, London, 14–16 April 1959

As already announced, the 1959 Spring Meeting will be held on London from Tuesday to Thursday, 14–16 April, inclusive. An interesting programme has been arranged for this meeting, which the Council hopes will be well attended by members and their guests. In particular, it is hoped that members will give their support to the Annual Dinner and Dance, at Grosvenor House. Visitors will be welcome at the May Lecture and at the scientific and technical sessions; tickets of admission are not required.

All members resident in Europe will receive, separately, a Reply Form for completion in connection with this meeting. Others, resident outside Europe, who intend to be present are asked to apply for a Reply Form.

PROGRAMME

Tuesday 14 April

Morning

Location: Church House, Great Smith Street, S.W.1. (Convocation Hall).

10.0 a.m. *Annual General Meeting:*

Election of Officers.

Report of Council for the Year ended 31 December 1958.

Report of the Honorary Treasurer for the Financial Year ended 31 August 1958.

Installation of the New President, Mr. G. L. Bailey, C.B.E., M.Sc., F.I.M.

Presidential Address.

Presentation of Institute Medals.

Afternoon

Location: Church House, Great Smith Street, S.W.1. (Convocation Hall).

2.30 p.m. *Theme: Fatigue.* A discussion based on the following papers published in the *Journal:*

Wood, W. A., and R. L. Segall: "Softening of Cold-Worked Metal by Alternating Strain". (No. 1822; Jan., 1958).

Wood, W. A.: "Cracking of Mercury-Coated Alpha-Brass under Alternating Strain". (No. 1823: Jan., 1958).

Hull, D.: "Surface Structure of Slip Bands on Copper Fatigued at 293°, 90°, 20°, and 4·2° K.". (No. 1850; May, 1958).

Fegredo, D. M., and G. B. Greenough: "The Fatigue Properties of Zinc". (No. 1866; Sept., 1958).

Kemsley, D. S.: "The Behaviour of Cold-Worked Copper in Fatigue". (No. 1867; Sept., 1958).

Kennedy, A. J.: "The Dependence of Micro-Creep Properties on the Development of Fatigue in Lead". (No. 1893; Jan., 1959).

Evening

Location: Royal Institution, Albemarle Street, W.1.

7.0 p.m. *May Lecture* by Professor Fred Hoyle.

8.30 for 8.45 p.m. *Council Dinner in Honour of the May Lecturer.*

Wednesday 15 April

Morning

PROGRAMME "A"

Location: Church House, Great Smith Street, S.W.1. (Hoare Memorial Hall).

10.0 a.m. *Discussion*, arranged by the Metallurgical Engineering Committee, on the following papers to be published in the March issue of the *Journal:*

Russell, J. B., and F. R. Nichols: "Equipment and Practice for Continuous Casting and Rolling by the Properzi Process".

Hamer, R. D.: "The Hazelett and Rotary Strip Casting Machines for the Continuous Casting of Aluminium".

PROGRAMME "B"

Location: Church House, Great Smith Street, S.W.1. (Convocation Hall).

10.0 a.m. *Lecture*, arranged by the Nuclear Energy Committee, on "Metallurgical Developments Outlined at the Geneva Conference on Peaceful Uses of Atomic Energy", by Dr. H. M. Finniston, followed by discussion.

Afternoon

PROGRAMME "A"

Location: Church House, Great Smith Street, S.W.1. (Hoare Memorial Hall).

2.30 p.m. (a) Continuation of discussion from morning session.

Followed by:

(b) *Joint discussion* on the following papers published, or to be published, in the *Journal:*

COOK, MAURICE, and E. SWAINSON: "Arc Melting of Reactive and Refractory Metals". (No. 1897; Feb., 1959).

STEPHENSON, J.: "The Vacuum Casting of Uranium". (No. 1898; Feb., 1959).

RANDALL, W. F., and H. H. SCHOLEFIELD: "Experiences in Vacuum Melting Some Special Alloys". (No. 1899; Feb., 1959).

BARRETT, A. S. D., and M. E. HARPER: "Selection of Pumping Systems for Vacuum Metallurgical Processes". (To be published in March).

PROGRAMME "B"

Location: Church House, Great Smith Street, S.W.1. (Convocation Hall).

2.30 p.m. *Discussion*, arranged by the Nuclear Energy Committee, on the following papers in the *Journal:*

GREGG, S. J., and W. B. JEPSON: "The High-Temperature Oxidation of Magnesium in Dry and in Moist Oxygen". (No. 1900; Feb., 1959).

GOLDSCHMIDT, H. J.: "A High-Temperature X-Ray Investigation of Niobium Pentoxide and Some Problems Concerning the Oxidation of Niobium". (To be published in March).

Evening

Location: Grosvenor House, Park Lane, W.1.

7.0 for 7.30 p.m. DINNER and DANCE. Dress: Evening dress or uniform, with decorations. Tickets, price 42*s.*, including coffee.

Thursday 16 April

Morning

Location: Church House, Great Smith Street, S.W.1. (Hoare Memorial Hall).

9.30 a.m. *Symposium on Practical Aspects of Metal Physics*, arranged by the Metal Physics Committee. The following contributions will be made, to be followed by questions:

(*a*) General Introduction, by Professor A. H. COTTRELL and Dr. J. NUTTING.

(*b*) "Nucleation Aspects of Solidification", by Mr. A. CIBULA.

(*c*) "Mechanical Forming", by Dr. T. Ll. RICHARDS.

Afternoon

Location: Church House, Great Smith Street, S.W.1. (Hoare Memorial Hall).

2.0 p.m. *Symposium on Practical Aspects of Metal Physics* (continued). The following contributions will be made, to be followed by questions:

(*d*) "High-Strength Alloys", by Dr. T. BROOM.

(*e*) "Electromagnetic Properties of Metals", by Dr. D. W. WAKEMAN.

(*f*) "Radiation Damage", by Dr. A. T. CHURCHMAN.

Evening

Location: 17 Belgrave Square, S.W.1.

7.30–11.0 p.m. CONVERSAZIONE and EXHIBITION (day dress). Tickets, price 10*s.* Ladies will be welcome. Number of tickets issued will be limited.

"Powder Metallurgy"

The attention of members is again directed to the recent appearance of the first issue of *Powder Metallurgy*. An announcement regarding this new publication was made in the November issue of the *Bulletin* (p. 113). It will contain not only the proceedings of the Powder Metallurgy Joint Group of The Iron and Steel Institute and The Institute of Metals, but also all papers dealing with powder-metallurgy subjects received in future by the two Institutes.

The first issue—a double number of 272 pp.—contains all the contributions invited for the first three meetings of the Joint Group, together with summaries of discussions at the first two meetings (i.e. those held in December 1957 and March 1958). A detailed list of contents is given below.

In future *Powder Metallurgy* will be published twice a year. It will be obtainable only by annual subscription: 10*s.* ($1.85) post free to members of either Institute or 25*s.* ($3.80) post free to non-members. Subscriptions should be sent to The Secretary, Powder Metallurgy Joint Group, 17 Belgrave Square, London, S.W.1. Cheques should be made payable to "Powder Metallurgy".

Contents of "Powder Metallurgy" No. 1/2

"The Continuous Production of Strip by the Direct-Rolling Process", by D. K. Worn (*The Mond Nickel Co. Ltd., Birmingham*).

"The Consolidation of Metal Powders by Hot Working within Sheaths", by J. Williams (*Atomic Energy Research Establishment, Harwell*).

"Developments in Vacuum Sintering Furnaces", by M. Donovan (*The General Electric Co. Ltd., Wembley*).

"Conditions for Effective Vacuum Sintering and Their Realization in Practice", by Otto Winkler (*Geraetebau-Anstalt, Balzers, Fürstentum, Liechtenstein*).

"The Pressureless Sintering of Loose Beryllium Powder", by T. R. Barrett, G. C. Ellis, and R. A. Knight (*Atomic Weapons Research Establishment, Aldermaston*).

"Zone Sintering", by J. Antill and M. Gardner (*Atomic Energy Research Establishment, Harwell*).

Summary of discussion.

THIRD MEETING, 17 DECEMBER 1958:

Symposium on "The Powder Metallurgy of Metal–Ceramic Materials".

"Recent Developments in the Field of Silicides and Borides of the High-Melting-Point Transition Metals", by R. Kieffer and F. Benesovsky (*Metallwerk Plansee A.G., Reutte, Austria*).

"Bonding in Carbides, Silicides, and Borides", by D. A. Robins (*The General Electric Co. Ltd., Wembley*).

"The High-Temperature Properties of Ceramics and Cermets", by E. Glenny and T. A. Taylor (*National Gas Turbine Establishment, Farnborough*).

"The Oxidation of Zirconium Carbide in High-Temperature Combustion Gases", by W. Watt (*Royal Aircraft Establishment, Farnborough*).

"Fabrication and Properties of Chromium–Alumina and Molybdenum–Chromium–Alumina Cermets", by J. B. Huffadine, L. Longland, and N. C. Moore (*The Plessey Co. Ltd., Towcester*).

"The Fabrication and Properties of Uranium Oxide–Iron Cermets", by W. J. Wright, R. B. Gibbon, and J. Williams (*Atomic Energy Research Establishment, Harwell*).

Monograph No. 24: "Advances in Inspection Techniques as Aids to Process Control in Non-Ferrous Metals Production"

The Institute has now reprinted, in the form of a monograph, the ten papers contributed to the Symposium held at the Spring Meeting 1958, with the discussion upon them. Contributions dealt with automatic gauge control in rolling mills; the accuracy of strip-thickness measurement by beta and gamma absorption; measurement, inspection, and automatic process control in the steel-strip finishing and tinplate industry; the use of ultrasonic testing for the control of quality in the manufacture of aluminium alloys and other non-ferrous materials; instrumentation in ultrasonic flaw detection; use of a search-coil apparatus for eddy-current testing of copper and its alloys; the inspection of tubes for flaws and variations in thickness; recent advances in radiographic techniques; an instrument for measuring the gas content of aluminium alloys during melting and casting; and control analysis of aluminium alloys and copper alloys using self-recording spectrometers.

Copies are available at the following prices (post free):

Members (one copy only)	21*s.* ($3.50)
Non-members	30*s.* ($4.65)
Libraries	25*s.* ($3.75)

Election of Members

The following 5 Ordinary Members, 1 Junior Member, and 26 Student Members were elected on 8 December 1958:

As Ordinary Members

GRIBBLE, Donald Cecil Edward, B.Sc., Technical Journalist, *Engineering*, 36 Bedford Street, London, W.C.2.

HORVATH, Louis, B.S., Chief Metallurgist, The Seymour Manufacturing Co., Seymour, Conn., U.S.A.

LIST, Frank, Head Foundry Foreman, Millars Machinery Co., Ltd., Bishops Stortford, Herts.

NICOLELIS, Efthemius H., Director of Research and Development (Metallurgical, Ceramic and Chemical Activities), Arwood Precision Casting Corp., 70 Washington Street, Brooklyn 1, N.Y., U.S.A.

WEINRAUB, Azriel, Dipl.-Ing., Ministry of Defence, Scientific Department, 26 Borohov St., Haifa, Israel.

As Junior Members

SAVORY, Eric Victor, B.Sc., Metallurgist, Standard Telephones and Cables, Ltd., Footscray, Sidcup, Kent.

As Student Members

BATCHELOR, Michael Geoffrey, Undergraduate, Department of Metallurgy, University of Manchester.

BENTLEY, Kenneth Paul, Undergraduate, Department of Metallurgy, University of Cambridge.

CARTER, John, Metallurgical Chemist, H. M. Robson, Ltd., Stafford Road, Fordhouses, Wolverhampton.

DAVIES, Byron, Undergraduate, Department of Metallurgy, University College of Swansea.

EAST, Michael Edward, Undergraduate, Department of Metallurgy, University of Nottingham.

EVANS, Christopher John Gillingham, Undergraduate, Department of Metallurgy, University of Cambridge.

FAWKES, Geoffrey Donald, Undergraduate, Department of Metallurgy, University of Cambridge.

GROVES, Geoffrey William, Undergraduate, Department of Metallurgy, University of Cambridge.

HALL, Peter, Undergraduate, Department of Metallurgy, University of Manchester.

HUGHES, John Michael, Undergraduate, Department of Metallurgy, University of Cambridge.

JUKES, Michael Harry, Metallurgical Chemist, Star Aluminium Co., Ltd., Marston Road, Wolverhampton.

KENT, Keith George, Undergraduate, Department of Metallurgy, University of Cambridge.

KNOTT, John Frederick, Undergraduate, Department of Metallurgy, University of Sheffield.

LYNE, Michael, Undergraduate, Department of Metallurgy, University College of Swansea.

MASON, Harold, Undergraduate, Department of Metallurgy, University of Birmingham.

MORETON, Roger, Undergraduate, Department of Metallurgy, University of Cambridge.

MORGAN, Christopher, Undergraduate, Department of Metallurgy, University of Cambridge.

MUTTER, Alan Robert, Undergraduate, Department of Metallurgy, University College of Swansea.

OATEY, Michael John, Undergraduate, Department of Metallurgy, University of Nottingham.

PARAMAHAMSA, Nishtala Ramakrishna, B.Sc., B.Tech., Graduate Student, Indian Institute of Science, Bangalore, India.

ROBERTS, Colin, Undergraduate, Department of Metallurgy, University College of Swansea.

SIDEY, M. Paul, Undergraduate, Department of Metallurgy, University College of Swansea.

THOMPSON, Christopher Alan, Undergraduate, Department of Metallurgy, University of Nottingham.

TURNER, Gerard L'Estrange, B.Sc., A.Inst.P., Student of Metallurgical Crystallography, Battersea College of Technology, London, S.W.11.

TURNER, John Raymond, Undergraduate, Department of Metallurgy, University of Nottingham.

WALLER, David Neville, Undergraduate, Department of Metallurgy, University of Manchester.

PERSONAL NOTES

DR. B. H. ALEXANDER has been appointed Vice-President in charge of Research of the Paper Mate Manufacturing Co., Santa Monica, Calif.

DR. H. T. ANGUS has been appointed Deputy Director of the British Cast Iron Research Association.

MR. H. E. ARBLASTER has been appointed Principal of the Ballarat School of Mines and Industries, Ballarat, Vic., Australia.

MR. W. BARR, a director of Colvilles, Ltd., has been nominated President of The Iron and Steel Institute for the year 1959–60. He will take office on 6 May.

DR. W. BETTERIDGE, of The Mond Nickel Co., Ltd., has been awarded the D.Sc. degree of Birmingham University.

BRIGADIER A. G. COLE has retired from Magnesium Elektron, Ltd., and will take up other appointments in due course.

DR. L. C. CORRÊA DA SILVA has been appointed Professor of Metallurgical Chemistry, University of São Paulo, Brazil.

DR. U. R. EVANS has been elected an Honorary Fellow of King's College, Cambridge.

DR. J. F. EWING has left the Tubular Products Division of the Babcock and Wilcox Co., Beaver Falls, Pa., and is now at the Company's Nuclear Facilities Plant, Lynchberg, Va.

MR. A. R. FORD has left Vowles Aluminium Foundry Co., Ltd., to join the Barton Group of Companies as Managing Director of the Premier Aluminium Casting Co., Ltd.

MR. J. GLEN, of Colvilles Ltd., has been awarded the D.Sc. degree of Glasgow University.

MR. L. GRAINGER has been appointed Head of the Metallurgy Division of the Atomic Energy Research Establishment, Harwell, in succession to Dr. H. M. Finniston. Mr. Grainger was previously with the Industrial Group of the U.K.A.E.A.

MR. J. C. HOWARD has been appointed Managing Director of a newly formed company—Birlec-Efco (Melting), Ltd.

MR. C. J. HUFFMAN has been appointed technical specialist in the pig, ingot, and billet-product office of Kaiser Aluminum and Chemical Sales, Inc.

MR. DONALD B. HUNTER has taken up an appointment as a Research Metallurgist in the Research Department, Solid-State Electronics, Philco Corporation, Philadelphia, Pa.

MR. M. I. JACOBSON has left the Chase Brass and Copper Co., Waterbury, and is now in the Metallurgy and Ceramics Department, Lockheed Missile Systems Division, Palo Alto, Calif.

DR. H. W. KING has left Birmingham University and is now at the Mellon Institute, Pittsburgh.

DR. M. VAN LANCKER has been awarded the Prix François Hébert by the Académie des Sciences de l'Institut de France for his papers on the thermodynamics of metals and alloys.

DR. CARLETON C. LONG, Director of Research of the Zinc Smelting Division of the St. Joseph Lead Co., Monaca, Pa., has been elected Vice-President of the Metallurgical Society of the American Institute of Mining, Metallurgical, and Petroleum Engineers. He will become President in February 1960.

DR. P. R. MARSHALL has been appointed a Director of Metal and Plastic Components, Ltd., Birmingham.

MR. T. C. MEAD has been awarded the Ph.D. degree of the University of Wales and has now taken up a post in the Powder Metallurgy Section of The Mond Nickel Co., Ltd., Birmingham.

MR. C. MOORE has left Sheffield University and is now in the Physical Metallurgy Section of the Research Department, Metropolitan-Vickers Electrical Co., Ltd., Manchester.

DR. P. OLMER has left the Ecole Nationale Supérieure des Mines de Nancy and is now at the Laboratoire Central des Industries Electriques, Fontenay-aux-Roses (Seine).

MR. R. J. M. PAYNE has left J. Stone and Co. (Charlton), Ltd., to take up a post with Teddington Aircraft Controls, Ltd., Cefn Coed, near Merthyr Tydfil.

DR. J. G. PEARCE has retired from the position of Director of the British Cast Iron Research Association. He had held the post since 1924.

MR. G. ROBINSON has left Burnley Aircraft Products, Ltd., and joined the Rollason Wire Co., Ltd., Birmingham.

MR. K. ROSE has left the British Non-Ferrous Metals Research Association and taken up an appointment with Siemens Edison Swan, Ltd., Brimsdown.

DR. I. S. SERVI, former staff metallurgist at the Metals Research Laboratories, Electro Metallurgical Co., Niagara Falls, N.Y., has assumed a new post with the Company, in which he will be responsible for fundamental research in the fields of solid-state physics and surface chemistry.

MR. E. E. THUM, founder and editor-in-chief of *Metal Progress*, has been elected an Honorary Member of the American Society for Metals.

MR. G. P. TINKER has been appointed Chairman of a newly formed company—Birlec-Efco (Melting), Ltd.

New Year Honours

The following members received awards in the New Year Honours:

MR. S. E. CLOTWORTHY, Managing Director of Northern Aluminium Co., Ltd. (C.B.E.)

DR. MAURICE COOK, Chairman of Imperial Chemical Industries, Ltd., Metals Division. (C.B.E.)

MAJOR P. L. TEED, Deputy Director, Department of Aeronautical Research and Development, Vickers-Armstrongs (Aircraft), Ltd., Weybridge. (O.B.E.)

Death

The Editor regrets to announce the death of:

MR. ROBERT THATCHER ROLFE, O.B.E., formerly Chief Metallurgist to W. H. Allen, Sons and Co., Ltd., Bedford, on 9 December 1958, aged 74.

LETTER TO THE EDITOR

" Ghost " Twins

FIGS. 1 and 2 are two photographs taken from slightly stressed, cast, pure bismuth metal showing regions (bands) in which stresses have accumulated. As these bands are not

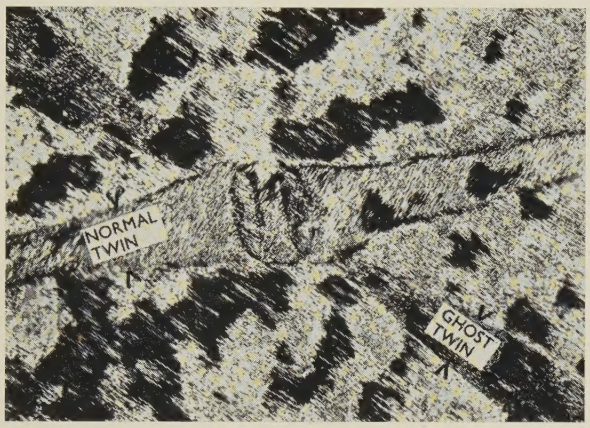

FIG. 1.—" Ghost " twin resulting in the formation of two secondary twins in a normal twin in slightly stressed bismuth. Vilella's etchant; polarized light. × 500.

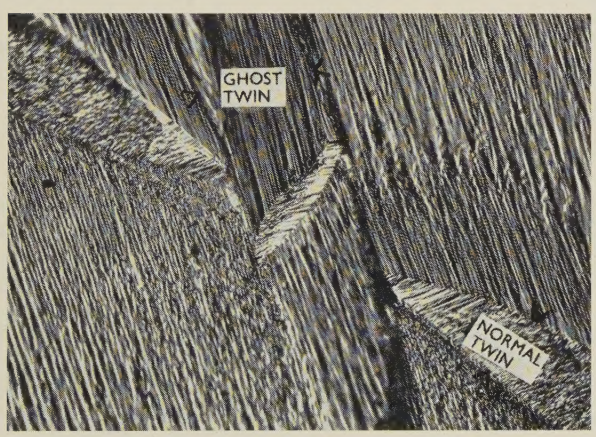

FIG. 2.—Normal twin resulting in the formation of secondary twin in a " ghost " twin in slightly stressed bismuth. Vilella's etchant; normal light. × 500.

real twins, but are revealed by etching and are sometimes visible only in polarized light, I call them " ghost " twins.

Such ghost twins can result in secondary twinning in the region of former natural twins (Fig. 1). The natural twins, however, when adjoining the ghost twins can result in secondary twinning also (Fig. 2).

Because twinning, as generally accepted, is connected with the movement of dislocations under stress, the question arises: how can dislocation theory be applied to the formation of ghost twins? It appears that shear stresses are solely responsible for the production of twins and other sorts of bands, e.g. slip lines, &c. Therefore, the ghost twins shown are bands in which shear stresses have accumulated but are not yet high enough to produce a normal twin. Etching reveals, however, the stressed regions (ghost twins) in spite of the fact that they possess the same orientation as the parent material.

W. J. WRAZEJ

Physical Metallurgy Division,
Department of Mines and Technical Surveys,
Ottawa, Ont., Canada.

NEWS OF LOCAL SECTIONS AND ASSOCIATED SOCIETIES

Leeds Metallurgical Society

At a meeting of the Society held on 6 November, Mr. C. V. WILSON, of N. C. Ashton, Ltd., gave a lecture on:

Aluminium Bronzes

The lecturer noted the early use of aluminium bronzes and then went on to discuss in some detail the mechanical properties and resistance to corrosion of the simple copper–aluminium alloys containing up to 15% aluminium. Particular reference was then made to the effects of heat-treatment on the mechanical properties and microstructure of the alloy containing 9·7% aluminium. The general effects on properties and constitution of additions of iron, nickel, cobalt, titanium, lead, tin, zinc, and silicon were then outlined, together with the changes obtained in mechanical properties by precipitation-hardening effects, which were explained by reference to the Cu–Al–Ni ternary system and the kappa phase.

Production methods were described and illustrated by colour slides, with emphasis on the development of the Durville casting process and including hot working. Typical applications were detailed and illustrated, the various applications being explained in terms of mechanical properties, corrosion-resistance, wear-resistance, non-magnetic, and non-sparking properties.

At a meeting on 4 December, Mr. J. LUMSDEN, of the Imperial Smelting Corporation, Ltd., gave a lecture on:

Thermodynamics in Metallurgy

The lecturer dealt with his subject from the viewpoint that thermodynamics is based on the two laws of the conservation and degradation of energy, the latter being interpreted in terms of the randomness of atomic locations and moments. These physical laws are then expressed mathematically to facilitate their application to thermodynamic studies.

Simple thermodynamics was then applied to known values for the volatility of the Group IIIB metals to demonstrate that these are really decomposition pressures and not vapour pressures—a fact that considerably alters their significance in calculating the extent to which volatilization of these metals may occur in various processes. Going from pure compounds to solutions, relationships were established between the variation with concentration of the activities of the components. A good approximation was established, for some liquid binary alloys for a simple regular solution formula, to the thermodynamic properties. The full thermodynamic interpretation of experimental work on more complex systems, including slags, was conceded to be difficult.

In discussion, Mr. Lumsden made a particular point of the fact that thermodynamics could usefully be included in the early, rather than final, stages of metallurgical study so that its application would become more common. He emphasized that conclusions of practical value could be obtained quite easily by the application of thermodynamics to known experimental results.

OTHER NEWS

Engineering, Marine, Welding, and Nuclear Energy Exhibition, London, 16–30 April 1959

The Institute will pay an official visit to the Engineering, Marine, Welding, and Nuclear Energy Exhibition on Thursday, 23 April 1959. Complimentary tickets will be distributed to members, in due course, with the *Journal*.

Fifth International Conference on Electrodeposition and Metal Finishing

The International Council for Electrodeposition and Metal Finishing announces that an International Conference, the fifth in this series, will take place in June 1959, at Detroit, U.S.A. The last International Conference was held in 1954, when it was decided to hold such Conferences every five years.

The Conference will deal with technical, scientific, and practical aspects of electrodeposition and metal finishing. It is expected that some thirty or more papers on these subjects will be presented by specialists from America, Great Britain, the European Continent, and other parts of the world.

The American Electroplaters' Society will act as the host Society. The Conference coincides with the 50th Anniversary of this Society, which will simultaneously stage its Annual Congress in Detroit, so that many interesting events, both technical and social, will be open to those attending the International Conference.

Further information relating to the Programme, and arrangements generally, will be available *on written request* to the Institute of Metal Finishing, 32 Great Ormond Street, London, W.C.1.

26th International Foundry Congress

The 26th International Foundry Congress will be held in Madrid from 4 to 10 October 1959. It is being organized by the Instituto del Hierro y del Acero, whose 4th Annual General Meeting is to take place at the same time. Details of both meetings can be obtained from the Instituto del Hierro y del Acero, Villaneuva 13, Madrid.

The British Metal Sinterings Association

The formation of the British Metal Sinterings Association was announced at a Press Reception held in London on 4 December 1958.

The Association includes the following Founder Members: Bound Brook Bearings, Ltd., Lichfield, Staffs.; The Manganese Bronze and Brass Co., Ltd., Ipswich, Suffolk; Metal and Plastic Components, Ltd., Birmingham 11; The Morgan Crucible Co., Ltd., London, S.W.18; John Rigby and Sons, Ltd., Cleckheaton, Yorks.; Sintered Metal Components (Chard), Ltd., Chard, Somerset; Sintered Products, Ltd., Sutton-in-Ashfield, Notts. The Secretaries are: Messrs. Peat, Marwick, Mitchell, and Co., Beaufort House, Newhall Street, Birmingham 3.

The aim of the Association is to place at the service of industry the combined experience of its members. Enquiries to the Secretaries will be forwarded to all member firms with the object of ensuring that the firm with the most experience in a particular field shall have the opportunity of putting forward the best solution to a problem.

Convention on Thermonuclear Processes

One of the most significant of recent developments has been the prospect of harnessing thermonuclear power for peaceful purposes. In recognition of the important part which Britain has played in this field The Institution of Electrical Engineers has arranged a Convention on Thermonuclear Processes to be held in London on 29 and 30 April, 1959. In view of the rapidity with which the subject is developing, details of the programme have not yet been finalized, but the probable range of topics to be covered is as follows:

Basic physics of thermonuclear processes.
Prototype British thermonuclear experiments—Zeta I, Sceptre III, and the Linear Pinch Constructional features of Zeta I.
Design problems in future Zeta-type systems.
Possibilities of direct conversion from nuclear to electrical energy.

Reviews of related work in the U.S.A. and the U.S.S.R. will also be included in the programme.

Copies of the papers will be available in advance and the complete proceedings of the Convention will be published subsequently in a supplement to the *Proceedings* of The Institution.

The Convention will be open to members and non-members of the Institution and all wishing to attend will be required to register. Those who wish to receive in due course Registration Forms and further particulars of the Convention should apply as soon as possible to the Secretary of The Institution of Electrical Engineers, Savoy Place, London, W.C.2.

The Use and Measurement of Radioisotopes

A strictly limited number of places are again available on the four-week full-time radioisotope course at Sir John Cass College. The next course will begin on 11 May, 1959. Applications for these remaining places can now be considered, and reservations may also be made now for future courses. The course will be largely practical in content and are suitable for persons of graduate standing. The fee is £30. Further particulars and application forms may be obtained from the Secretary of the College, Jewry Street, London, E.C.3.

"Crystal Imperfections and the Chemical Reactivity of Solids"

The Council of the Faraday Society has accepted an invitation from the National Research Council, Ottawa, and Canadian Industries to hold a General Discussion in Kingston, Ont., on 2–4 September 1959. The subject will be "Crystal Imperfections and the Chemical Reactivity of Solids". In connection with the meeting, visits are being planned to universities and industrial concerns. Details may be obtained from the Secretary, The Faraday Society, 6 Gray's Inn Square, London, W.C.1.

DIARY

Local Sections and Associated Societies

3 March. Oxford Local Section. "Metallurgical Applications of the Electron Microscope", by Dr. J. Nutting. (Cadena Café, Cornmarket Street, Oxford, at 7.0 p.m.)

3 March. South Wales Local Section. "Effects of Vacancies and Other Point Defects in Metals", by Professor A. H. Cottrell. (Department of Metallurgy, University College, Singleton Park, Swansea, at 6.30 p.m.)

4 March. Manchester Metallurgical Society. "The Behaviour of Steels During Hot Working, with Particular Reference to Hot Extrusion Processes", by P. Sukolski. (Manchester Room of the Central Library, Manchester, at 6.30 p.m.)

5 March. Birmingham Local Section. Details to be announced.

5 March. East Midlands Metallurgical Society. "Plastic-Coated Sheet Steel", by F. H. Smith and W. E. Martin. (College of Art, Green Lane, Derby, at 7.30 p.m.)

5 March. Leeds Metallurgical Society. "Metallurgical Applications of High-Resolution Microscopy", by Dr. J. Nutting. (Lecture Room C, Chemistry Wing, The University, Leeds 2, at 7.15 p.m.)

5 March. London Local Section. "High-Temperature Brazing", by A. Cibula. (Joint Meeting with the Institute of Welding.) (17 Belgrave Square, London, S.W.1, at 6.30 p.m.)

7 March. Liverpool Metallurgical Society. Annual Conversazione.

9 March. North East Metallurgical Society. "The Development of the Tungsten Filament Lamp", by Dr. B. P. Dudding. (Cleveland Scientific and Technical Institution, Corporation Road, Middlesbrough, at 7.15 p.m.)

9 March. Scottish Local Section. Annual General Meeting. (Institution of Engineers and Shipbuilders in Scotland, 39 Elmbank Crescent, Glasgow, C.2, at 6.30 p.m.)

12 March. Liverpool Metallurgical Society. "The Rare Metals Used in Atomic-Energy Applications", by L. R. Williams. (Library of the Department of Metallurgy, University of Liverpool, 146 Brownlow Hill, Liverpool 3, at 7.0 p.m.)

17 March. South Wales Local Section. Annual General Meeting, followed by "A General Review of Current Research Work in the Metallurgy Department, University College, Swansea", by Professor H. O'Neill. (Department of Metallurgy, University College, Singleton Park, Swansea, at 6.30 p.m.)

18 March. Liverpool Metallurgical Society. Visit to Magnesium Elektron, Ltd., Clifton Junction, Manchester.

18 March. Manchester Metallurgical Society. "Metallurgical Background of Casting Production", by A. Cibula. (Manchester Room of the Central Library, Manchester, at 6.30 p.m.)

19 March. Birmingham Local Section. Annual General Meeting. (Birmingham Exchange and Engineering Centre, Stephenson Place, Birmingham, at 6.30 p.m.)

19 March. Southampton Metallurgical Society. "Vacuum Melting of Steel", by J. W. S. Stafford. (Small Physics Lecture Theatre, The University, Southampton, at 7.15 p.m.)

26 March. Sheffield Local Section. "The Nimonic Alloys", by Dr. W. Betteridge. (Engineering Lecture Theatre, The University, St. George's Square, Sheffield 1, at 7.30 p.m.)

APPOINTMENTS VACANT

BIRLEC HEATING DIVISION Sales Department want Furnace Design Engineer. Duties include discussion with customer and liaison with Engineering Department Designers and Estimators, and preparation of Project and Tender Specifications. H.N.C. or Engineering Degree standard. Apply to Personnel Manager (JMP), Birlec Ltd., Tyburn Road, Birmingham 24.

CENTRAL ELECTRICITY GENERATING BOARD

Extensive Research Laboratories, including facilities for the examination of highly radioactive materials, are shortly to be erected adjacent to the Generating Station at Berkeley, Gloucestershire.

Applications are invited for appointments in the Research and Development Department from suitably qualified persons who are interested in studying the effects of irradiation on materials and applying the results to the improvement of the operation and efficiency of the Board's Civil Nuclear Generating Stations.

Candidates should possess an Honours degree in one of the physical sciences and be capable team leaders. A knowledge of the techniques of handling radioactive materials would be an advantage.

Salaries on scales within the overall range £1116–£1945 p.a., according to duties and responsibilities.

Applications stating age, qualifications, experience, present position, and salary should be forwarded by 28 February. Ref. JM/399.

SCIENTISTS are invited to apply for appointments in the Materials Section of the Board's Research and Development Laboratory to be built at the Berkeley Nuclear Power Station, Gloucestershire. The Section will study problems connected with improvements in the economic generation of power and the effect of irradiation on materials.

Suitable training can be arranged at other establishments and previous experience in the nuclear field is not therefore essential.

Salaries on scale within the range £550–£1265 p.a., according to duties and responsibilities.

Applications stating age, qualifications, experience, present position and salary should be forwarded by 31 March. Ref. JM/397.

Applications should be forwarded to I. G. Ellis, Personnel Officer, 24/30 Holborn, London, E.C.1. Please mark envelopes "Confidential" quoting reference.